

Transparency and Replicability in Mixed-Methods Designs using Experiments^{1 2}

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Abstract:

The use of mixed methods designs containing experiments has become more popular in the social sciences over the past decades. Beyond the analytical phase of research, scholars incorporate qualitative components in their research designs with the objective of improving the experimental design. For example, researchers may make use of interviews to make their experimental treatments more realistic. Yet, these important steps are rarely pre-registered or incorporated as part of pre-analysis plans. In this paper we argue that describing the qualitative components of research designs containing experiments as part of the pre-registration process is key for transparency and replicability purposes. We also propose a series of concrete steps that researchers can take to ensure that qualitative components are incorporated in such a way that other researchers can follow the same steps that the original researchers took.

1. Introduction

The use of mixed methods designs containing experiments has become more popular in the social sciences over the past decades (Harbers and Ingram 2020; Seawright 2016; Weller and Barnes 2014). In the analysis of experimental results, the qualitative component is typically used to illuminate causal mechanisms (Dunning 2015; Levy Paluck 2010). However, when it comes to improving experimental designs, the capacity of qualitative methods to improve measurement is discussed less frequently. Prior to the analysis of data, qualitative methods can be used to design better contextualized, more realistic, experimental treatments (Dunning 2008; Dunning and Harrison 2010; Seawright 2016; 2021)³. Yet, the process of using qualitative methods to improve

¹ Authors in alphabetical order, equal contribution is implied.

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³ By experimental treatment we mean the different kind of manipulations used in surveys and field experiments. Even though a randomized controlled trial may require less emphasis on contextual

treatment design, for example, through the establishment of a sequence that can be replicated, is rarely formalized. We highlight the importance of standardizing the use of qualitative research to improve experimental treatments by pre-registering it as part of pre-analysis plans (hereafter, PAPs). In formalizing this process researchers can contribute to the transparency and replicability of the entire research process.

Defining realistic treatments is usually a challenge for experimental designs.

Experimentalists debate how best to produce realistic treatments (Blair and McClendon 2021). In other words, researchers are concerned with generating treatments that make subjects react as if they had experienced the same situation in real life. If they succeed, the study is considered to have high level of “experimental realism” (Seawright 2021). However, experiments in general lack a sense of realism because they present hypothetical situations to participants. Contextual knowledge can contribute to ameliorating this limitation because it allows researchers to anchor the experiment in a real circumstance with a level of specificity not possible in a hypothetical.

Recent debates in the experimental literature reflect the advantages of incorporating qualitative elements to aid realism (Seawright 2021). Qualitative research encompasses a wide variety of tools with varying degrees of involvement (from ethnographic research to the review of press or historiographic accounts) (Cyr 2019; Harbers and Ingram 2020; Kapiszewski, MacLean, and Read 2015). Adopting a wide range of qualitative methods and tools may not always be possible within the timeframe (or resources available) of a study. Yet, researchers can take advantage of this wide range of tools by incorporating some inductive elements drawn from qualitative research to

knowledge given that interventions are generally more realistic, contextual knowledge is still crucial to identify the best suited intervention and to adjust it to the specificities of the place/people.

strengthen their experimental design. Moreover, this can be accomplished without detracting from the overall research, but rather enabling improvement of its design.

The use of qualitative research tools in the context of experimental designs allows researchers to strengthen causal inference by further developing the analytical phase of a research design, but also by enhancing the design itself.⁴ For example, Oliveros and Bell-Martin discuss aspects of the process of combining qualitative fieldwork and experiments in this issue. Some studies have incorporated qualitative components in order to build more realistic treatments, but this process is rarely formalized.⁵

Formalization would enable researchers to make their designs more transparent and replicable.

We argue that pre-registration—making a research design public—can boost researchers' efforts to formalize the incorporation of qualitative components to improve experimental designs. In formalizing these steps, researchers make the entire research design—not just the forward-looking parts—transparent, and replicable. Currently, experimentalists have debates about what components of their work should be pre-registered, but there is no single, standardized criteria for what should be included in a PAP (Boudreau 2021). In this piece we discuss the process of formalization of the qualitative phase in experimental research designs and propose some sections that should be incorporated as part of a PAP. In doing so, we contribute to the literature on

⁴ Even though in some designs the distinction between analytical and design phase may be blurry, our focus is on experimental designs. In those cases, the analytical phase is defined by the statistical analysis of data.

⁵ See for example Auerbach and Thachil (2020). They use ethnographic methods to define experimental treatments resulting in a compelling research design. However, the steps taken were not specified.

research transparency in political science (Jacobs 2020; Jacobs et al. 2021; Kapiszewski and Karcher 2021).

2. The Benefits of Incorporating a Qualitative Phase in the Design of Experimental Research

Mixed-methods designs including experiments have gained popularity in the social sciences. Experimentalists have begun to consider the benefits of including qualitative elements in designs containing experiments in order to improve causal inference.

Qualitative elements are non-numeric, detailed information obtained through: ethnographies, in-depth interviews, direct observation, focus groups, systematic press review, archival research, and historical sources, among others. Designs that incorporate qualitative components typically include them in the analytical phase (Clayton et al. 2020; Dunning 2015; Levy Paluck 2010). They focus on techniques such as interviews, focus groups, and direct observation and the advantages of these techniques in identifying causal mechanisms. More recently, other researchers have highlighted the importance of the qualitative phase as a mechanism to improve the experimental design itself by improving internal and external validity (Jha, Rao, and Woolcock 2007; Pérez Bentancur and Tiscornia 2021; Seawright 2021; Thachil 2017; 2018; Tiscornia et al. 2021).

Improving causal inference requires high internal validity. In turn, internal validity requires a high degree of correspondence between the experimental intervention and the context. This is a challenge for experiments, as there is always some level of “fakeness” in interventions (Blair and McClendon 2021). The goal, therefore, is to devise treatments that reproduce situations that feel realistic to experimental subjects. This

requires incorporating contextual knowledge, or what Seawright (2021) calls “the meaning of treatment”. Better measurement also ensures construct validity—how well the researcher’s measurement instrument can capture the phenomenon to be measured.

Better contextual knowledge also improves external validity. Deep knowledge of the context produces a better understanding of the scope of a theoretical argument, which allows researchers to be more precise when it comes to their ability to generalize.

Encinas develops this point in further detail in this issue. This is a central point, as a potential weakness of experiments is low external validity (Blair and McClendon 2021; Seawright 2016).

Thachil (2017, 2018) and Dunning and Harrison (2010) are good examples of the use of qualitative research to improve experimental designs. Thachil (2017, 2018) uses ethnographic fieldwork to define his sample and improve a vignette experiment in his research on identity politics in India. To build his sample, Thachil used interviews to come up with a list of markets where his population of interest, which is highly mobile, would be present (2017:913). To improve the vignettes, he used conversations he maintained with poor migrants to ensure that the language was reflective of the target population (2017:909) Focusing on ethnic cleavages in Mali, Dunning and Harrison (2010) used interviews to validate and refine an experiment prior to fielding it (Dunning 2008: 21-22). Clayton et al. (2020) conduct focus groups and experiments to assess the extent of voters’ gender bias in Malawi. However, when they designed the experimental vignettes they did so without including relevant information from the focus groups, which they conducted in parallel. The authors speculate that this omission may have led to null findings in the experiment. From the focus groups they learned that women in

Malawi face defamation campaigns, which impacts voting behavior. As a result, the authors conclude that they could have used this information to include a “rumor mongering condition” in their experiment (2020:622).

The examples highlight the benefits of incorporating qualitative evidence to design better treatments. With few exceptions, for example Dunning (2008), the majority of research projects that include qualitative components to improve experiments do not incorporate them as part of the pre-registration process (Pérez Bentancur and Tiscornia 2021).

There is a wide range of qualitative methods and tools whose application would benefit researchers that employ mixed-methods designs with experiments. These methods and tools require different levels of involvement and resources (Kapiszewski, MacLean, and Read 2015; Curini and Franzese 2020). Researchers can decide which of these tools are more adequate to their design, and/or feasible to implement based on other considerations such as time constraints and budget. Similarly, not all experimental designs require the incorporation of qualitative components to the same degree.

Including qualitative elements is relevant to the extent that it provides researchers with better contextual knowledge when designing the treatment.

Researchers that combine methods might even consider pre-tests of their experimental designs as part of these qualitative elements, as long as they are not simply focused on the mechanical aspects. For example, in our research we pre-tested a survey experiment and we asked participants to provide a brief reflection on the experience of taking the survey with an open-ended question at the end, which we then used to adjust the

experiment that we fielded (Perez Bentancur and Tiscornia 2021). Doing so led us to reconceptualize the design phase as a non-linear process, a back-and-forth between deductive and inductive phases. Many times, researchers' starting point is deductive, but they will adjust their theory and hypotheses by alternating between deduction—induction—deduction. Acknowledging non-linearity in research design also constitutes an exercise in transparency because it reveals all the steps the researchers took to arrive at the final design (Yom 2015). For the same reason, it also makes replication possible.

The examples above suggest that researchers can, and do, incorporate qualitative elements to improve experimental designs without pre-registering them. We argue, however, that there are important benefits in formalizing the steps researchers take through a discussion in a PAP. In documenting how qualitative components improve experimental designs, we contribute to the literature on research transparency (Elman, Kapiszewski, and Lupia 2018). There are a variety of alternatives for documentation, such as generating methodological appendices (Kapiszewski and Karcher 2021). We propose implementing pre-registration through PAPs as one of these alternatives. Using PAPs increases transparency in at least three ways: it improves our understanding of the process of producing research, it allows a better understanding of how researchers reached their conclusions, and it makes research more accessible because it makes all steps in the research process explicit; thus, replicability results from transparency. Replicability implies that another researcher will be able to reconstruct the research process in the same context (or a different one) and reach similar conclusions about a

phenomenon.⁶ This requires information about how the data was produced and how the analysis was conducted (Jacobs et al. 2021).

3. Transparency and Replicability in Experimental Research Design: The role of PAPs

In recent years academics have raised concerns regarding the difficulty to replicate research designs, to the point where some of them characterize the current state of affairs as a “replication crisis” (Druckman and Green 2021; Malhotra 2021). The inability to replicate studies results from a lack of transparency in the research process. The absence of sufficient detail in research designs prevents other research teams from following the exact same steps with the goal of attaining the same result, which is central to the concept of replication. Consequently, some researchers have proposed pre-registration as a solution to the replication crisis (Boudreau 2021; Malhotra 2021).

Pre-registration consists of developing research questions, hypotheses and analyses before observing the data, and making this information public on an independent registry. A PAP is a document describing the process that will be used to collect and analyze data (Boudreau 2021; Chen and Grady, n.d.) including, but not limited to, hypotheses, experimental designs, a description of the population to be studied. Pre-registration through a PAP prevents certain biases and increases research transparency by detailing the necessary steps for replication (Blair et al. 2019; Boudreau 2021; Jacobs 2020; Malhotra 2021; Pérez Bentancur and Tiscornia 2021).

⁶ Replicability refers to the process of information gathering, for example, the use of qualitative tools to inform an experiment. This does not mean that interviews or ethnographic research should be replicated, as the specific qualitative technique may have to be adapted based on considerations of applicability, time, resources, risks, or others.

Although researchers tend to agree on the importance of pre-registration, there is no consensus on exactly which elements of a research design to pre-register beyond the basic structure (hypotheses, measurement, tests). In fact, there is no single, standardized definition of a PAP, as evidenced by the wide variety of templates in different repositories, and the different degrees of flexibility allowed for documentation (Boudreau 2021).

Discussions around pre-registration emphasize its importance in promoting transparency. Typically, PAPs are linked to experimental designs with an emphasis on quantitative components: researchers typically register the treatment of interest, sample and subgroup characteristics, statistical power analyses, and steps for data analysis. Many times, researchers use qualitative elements to improve their experimental designs. For example, Thachil (2017) uses observations from the field to construct experimental vignettes. In our research about the micro-foundations behind public support for punitive policing, we incorporate information from interviews to refine experimental treatments (Tiscornia et al. 2021). Yet, this qualitative phase is rarely documented as part of PAPs. Our analysis of all available PAPs that use mixed-methods pre-registered in Evidence in Governance and Politics (EGAP) repository in 2019 (a total of 338) shows that only a small fraction (14, only 4%) explicitly report using the qualitative component to refine the research design. However, those PAPs do not include enough detail to allow replication of the qualitative component. For example, Bezzola and Brugger (2019) explicitly state in their PAP that they use fieldwork to identify relevant

experimental outcomes. Yet, they do not discuss how fieldwork led to the changes they made (Pérez Bentancur and Tiscornia 2021).⁷

One might wonder why include qualitative components as part of the PAP and not, for example, in the final manuscript. Even though a discussion of the use of qualitative research as part of the final manuscript is relevant, when it comes to transparency and replicability it is important to incorporate formalized steps as part of the PAP.

Researchers may want to compare the original objectives of the research design with what was achieved in the final manuscript (Boudreau 2021: 348). Besides, not all studies become published manuscripts (for example, publication bias against research that results in null findings might prevent others from knowing their results) which can bias what we know about a specific phenomenon (Boudreau 2021: 341, Malhotra 2021: 356). In addition, the level of detail needed for replication might not be relevant or appropriate for a manuscript that might have word limits or where too much detail might distract from substantive points.

If researchers use qualitative steps to refine an experimental design, incorporating them as part of a PAP independent of publication status of the final manuscript has several advantages: 1) it increases transparency because it illustrates all the steps used to arrive at the final design; 2) it helps minimize the possibility that a null or contradictory finding is the result of design flaws derived from absence of relevant contextual factors; 3) it aids replicability by facilitating adaptation of the experimental treatment to different contexts. PAPs are public goods, when researchers register as many relevant details of

⁷ “Social Investments of Mining Companies and Citizen Engagement in Local Governance,” see registered PAP here: <https://osf.io/8v5tw>

the research design as possible, they contribute to the improvement of their own research but also of research as a collective enterprise.

If they are so relevant, why are qualitative components not typically included as part of PAPs? One possibility is that researchers may choose not to incorporate qualitative components as part of experimental designs because they do not view them as necessary or because they view them as “pre-scientific,” and therefore do not think it is relevant to incorporate them as part of PAPs. Another alternative could be that existing PAP templates may not allow for this option. Yet, this is not the case as repositories are typically quite flexible in terms of what can be included in a PAP.

Even if researchers do not use mixed-methods designs, experimental designs still require some level of contextual knowledge that comes from qualitative sources. The kind or the extent of qualitative tools that researchers decide to incorporate might depend on considerations such as budget, time, access, even epistemological views. Other researchers can evaluate whether the resulting research design would have required additional qualitative elements. Regardless of the kind of qualitative tools they choose, if researchers choose to incorporate qualitative elements to strengthen their experimental designs, they should pre-register them.

Existing repositories provide varying degrees of flexibility to incorporate additional descriptive information (Boudreau 2021). For example, EGAP’s repository allows for the inclusion of the kind of information we propose.⁸ An additional tool is the

⁸ For an example of how flexible these documents can be, see Blair and Weintraub (2019), which includes an extensive discussion of ethical considerations. The PAP is available here: <https://osf.io/e5x6n/>

possibility to include amendments to the original PAP. In general, repositories allow for the submission of revised PAPs, if they are submitted before the intervention takes place. Researchers can pre-register a design, then conduct interviews or archival research, adjust their experimental design and submit an amendment.

If one were to incorporate qualitative components as part of a PAP, where would they add them? Recent research has provided some guidelines for relevant components in PAPs (Boudreau 2021), we believe that within those guidelines there is also space to include qualitative elements. For example, if researchers used qualitative components to improve their treatment, they could specify how in the section dedicated to describing the experimental design, or under a measurement section. The qualitative component could be tied to the sections devoted to describing the design, and the definition and operationalization of the treatment, or the construction of the sample, before discussing how the researcher plans to analyze the data.

4. Suggestions for Incorporating Qualitative Elements in PAPs

In this essay we have highlighted the usefulness of thinking about qualitative data beyond the analytical components of research. We argue that qualitative tools play a central role in mixed-methods research designs containing experiments because they contribute to improving treatments, sampling, and other components of the design. Although in many cases researchers incorporate these elements as part of their designs, they rarely make these steps explicit. We suggest that researchers can incorporate these steps as part of PAPs. In doing so, researchers improve transparency and replicability.

Implementing this process may require rethinking the phases of the research design, data collection, or fieldwork, or even the kind of information that needs to be collected. It may lead researchers to reconceptualize the research design phase as a non-linear process. As part of the research design, there is an inductive phase that typically happens after the initial deductive research design.

We propose that incorporating qualitative data is crucial because experiments are contextual, even when researchers do not use mixed-methods approaches. This can be done with varying degrees of depth, depending on feasibility. It may be the case that researchers have accumulated enough contextual knowledge that a qualitative phase may be deemed unnecessary, or they may not have sufficient resources to incorporate it. Even if researchers are using their contextual knowledge to improve their design, they should still make the steps they took to arrive at their final design, and the assumptions they made along the way, explicit as part of their PAP.

Based on this discussion, we propose a series of sections that researchers can incorporate when developing their PAP, once they have decided to include qualitative elements in their research design. If the qualitative elements are incorporated to improve the treatment, researchers should discuss how they did it in the section on measurement. For example, did specific interview questions contribute to illuminating relevant treatments the researcher had not previously considered? Researchers should register what the original experimental design was and how it was modified based on the qualitative data they used. Perhaps the list of attributes in a conjoint design was expanded or reduced based on archival research, or new items were included as part of a list experiment that resulted from direct observation, or a focus group. Or maybe the

type of experiment changed: for example, from a conjoint design to a vignette (Tiscornia et al 2021). Alternatively, researchers could have used qualitative information to better contextualize a vignette, or to mimic the language used, to make it more reflective of the reality on the ground (Masullo and Morisi 2021). They might choose to report this in a section on construct validity. Scholars could also use qualitative information to construct an experimental sample (see for example Thachil 2017; 2018). In this case, they may incorporate the discussion of the steps they took in a specific section dedicated to the sample. Scholars should carefully register all these steps as part of the PAP, as if they were instructions to be followed. It is not enough to say what qualitative elements they included, but how and with what aim.

These suggestions do not only apply to experimental designs, but they could also be easily incorporated in observational designs. Observational research can also be pre-registered before analysis, and it can include details on the use of qualitative components. For example, survey questionnaires can be improved by incorporating qualitative information, and codebooks can be analyzed to detect possible biases in the construction of databases used for analytical purposes.

The discussion presented here echoes recent academic concerns about the importance of pre-registration of research designs as it contributes to research transparency and replicability. We build on this point to highlight that in the context of mixed-methods research with experimental components, scholars use qualitative elements as part of the process of experimental design but without pre-registering them as part of a PAP. We propose that in formalizing these steps in a PAP, by clearly specifying the role of qualitative elements, researchers can make the process of designing their research more

transparent, and more easily replicable, which benefits their own research and the research enterprise as a whole.

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